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REMARKS

Claims 1 to 39 are pending. Claims 26 and 28 to 30 are allowed, and claim 2 is canceled.

1. At the outset, the Applicants would like to thank Examiner Weiner for the time she took on October 22, 2003, to discuss the merit of the application with their attorney.

2. Claims 1 to 4, 8, 13, 14, 16 and 31 are rejected under 35 USC 102(b) as being anticipated by Bai et al. (U.S. Patent No, 5,744,258). Bai et al. describe a high power, high energy, hybrid electrode and electrical energy storage device. The hybrid electrode includes both "high-energy" materials and "high-rate" materials. At Fig. 2, the Bai et al. patent shows that the high-energy material 42 contacts one side of a current collector 40 while the high-rate material 44 contacts the other side. Example 1 beginning at the bottom of column 3 describes a construction for a mixed carbon anode by mixing a "high-rate and high-energy" carbon together on the same electrode. Then, "high power can be delivered by discharging the double-layer capacitance of the high-surface area carbon. During the interim between pulses, the LiC₆ high-energy material discharges and recharges the high-rate material. Eventually, the 'high-energy' material is completely discharged."

Independent claims 1 and 31 have been amended to set

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forth that the anode active material consists essentially of an alkali metal. This "sacrificial" alkali metal is short circuited with any of a number of anode materials. Short-circuiting can be by parallel connection through a current collector (page 9, line 28 to page 10, line 1) or a construction in which the anode material directly contacts the alkali metal (Page 10, lines 2 to 15). As described at page 7, lines 17 to 24, "upon activating the cell with an ion-conducting electrolyte, the alkali metal migrates into the anode material resulting in complete consumption of the alkali metal." Then, the absence of the alkali metal in the cell "preserves the desirable safety and cycling properties of the anode material."

A secondary cell is typically built in a discharged condition with a lithiated material, for example LiCoO_2 , as the cathode active material. After the cell is hermetically sealed, a reverse potential is applied to the cell causing lithium ions to migrate from the cathode active material into the anode material. The anode material is typically carbonaceous. The cell is now in a charged state, ready to be discharged. The problem is that some percentage of the lithium ions intercalated into the anode material during initial recharging are irreversible and will never be available for cycling, regardless whether the cell is pulse discharged or discharged at a relatively slow rate or light load. An example of the latter is when the cell is used to power a cardiac defibrillator in a monitoring mode. This occurs when the defibrillator control circuitry is monitoring the

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heart in a normal beating rhythm.

The "sacrificial" alkali metal of the Applicants' claimed invention is for the purpose of compensating for the irreversible characteristics of a particular anode material, whether it is carbonaceous or otherwise. Again, this has nothing to do with how the cell will otherwise be discharge, whether it is in a pulsing mode as Bai et al. were concerned with or in a relatively light discharge mode. Simply, compensating for irreversible capacity and recharging an active material are two distinct aspects of cell construction and discharge.

In that respect, Bai et al. do not teach or suggest constructing a cell in a manner similar to that set forth in Applicants' amended independent claims 1 and 31. In their Example 1, the anode consists of carbon as the high-rate material and LiC_6 as the high-energy material. It is only during the intervals between pulse-discharging the high-surface area carbon material that the LiC_6 serves as a recharging material. Upon electrolyte activation, lithium present in LiC_6 is not "completely consumed through migration and intercalation into the anode material." This is so regardless whether the anode is constructed as shown in Fig. 2 with the two materials on respective sides of the current collector 40 or in the alternate embodiment constructions shown in Figs. 3 to 7. In Bai et al., once the high-energy LiC_6 material is consumed, there is no recharging of the high-rate carbon material after pulse discharging. In the Applicants' invention, this is not a concern because the sacrificial alkali metal is for the

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purpose of compensating for irreversible capacity during initial cycling.

Accordingly, the Bai et al. patent is not believed to teach, suggest or render obvious the Applicants' invention set forth in amended independent claims 1 and 31. Claim 2 is canceled. Claims 3, 4, 8 13, 14 and 16 are allowable as hinging from a patentable base claim.

Reconsideration of this rejection is requested.

3. Claims 9 to 11, 17 to 25, 27 and 35 are rejected under 35 USC 112, second paragraph. The indefinite language noted in these claims by the Examiner has been amended. Specifically, support for the amendment of "hard carbon" to "non-graphitizable carbon" is found in the specification at page 3, lines 30 to page 4, line 20.

Regarding claim 17, the alkali metal has been amended to be a structure having first and second major sides. A current collector contacts one of the sides. This means that the other side can be covered with a current collector or uncovered. For example, dependent claim 18 relates to a configuration where the alkali metal has a first current collector contacting one of its sides and a second current collector contacting its other side. In contrast, claim 7 relates to a configuration where the alkali metal only has one current collector.

Reconsideration of this rejection is requested.

4. The Applicants acknowledge the allowance of claims 26 and 28 to 30.

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5. Claims 5 to 7, 12, 15, 32 to 34 and 36 to 39 are objected to. However, it is not believed necessary to rewrite them in independent form in order to gain their allowance. Instead, these claims depend from amended independent claims 1 and 31. As discussed above, claims 1 and 31 are believed to be patentable, as are the claims that depend from them.

Reconsideration of this objection is requested.

It is believed that claims 1 and 3 to 39 are now in condition for allowance. Notice of Allowance is requested.

Respectfully submitted,



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